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much a result of creative energy as if a new species were to arise out of the dust of the earth" (pp. 380-382).

It is of course almost impracticable by means of isolated paragraphs to give any adequate impression of a whole volume of observation and discussion with a wealth of varied illustration. But we shall not go far astray, perhaps, in summing up Prof. Williams' attractive book as in great part a restatement, in terms of evolution, of the argument for design in nature.

W. H. D.

WINGE ON BRAZILIAN CARNIVORA.

In a recently published quarto of 103 pages* Mr. Herluf Winge gives the results of his studies of the extensive collections of Carnivora made near Lagoa Santa, province of Minas Geraes, southeastern Brazil, by Lund, Reinhardt and Warming, and now in the Zoölogical Museum at Copenhagen. The material thus brought together owes its peculiar interest to the fact that it consists partly of the remains of living animals and partly of bones and teeth from the earth deposits of the caves with which the region abounds. It is thus possible to compare the present fauna with the extinct fauna of which it is the immediate successor. As the author remarks (p. 79), the South American fauna is poorer in Carnivora than that of any other region except Australia. The latter was, however, probably isolated before the appearance of the order. While Lagoa Santa is, for a South American locality, remarkably well provided with Carnivora,† the group is represented by only four families, ten genera and twenty-five species. These the author arranges as follows:

* Jordfundne og nulevende Rovdyr (Carnivora) fra Lagoa Santa, Minas Geraes, Brasilien. Med Udsigt over Rovdyrenes indbyrdes Slægtskab. Af Herluf Winge. Aftryk af 'E. Museo Lundii,' en Samling af Afhandlinger om de i Brasiliens Knoglehuler af Professor Dr. P. W. Lund udgravede Dyr og Menne-skeknogler. Paa Carlsbergfondets Bekostning ud-givet ved Professor Dr. C. F. Lütken, Kjöbenhavn, 1895.

† *Bassaricyon*, *Cerculeptes*, *Lyncodon* and *Mustela* are the only genera, except perhaps a few now extinct, known to occur in South America, that have not yet been detected there.

FELIDÆ: *Felis tigrina*, *F. macroura*, *F. eira*, *F. concolor*, *F. onca*, *Machærodus neogæus*.

URSIDÆ: *Canis azaræ*, *C. vetulus*, *C. cancrivorus*, *C. jubatus*, *C. troglodytes*, *Icticyon pacivorus*, *I. venaticus*, *Ursus brasiliensis*, *U. bonariensis*.

PROCYONIDÆ: *Nasua narica*, *Procyon ursinus*, *P. cancrivorus*.

MUSTELIDÆ: *Galictis barbara*, *G. intermedia* (= *G. allamandi*), *G. vittata*, *Thiosmus suffocans* (= *Conepatus mapurito*), *Lutra platensis* (= *L. paranensis*), *L. brasiliensis*.

Twenty-three of these are found in the cave deposits ('jordfundne'), while eighteen are found living in the vicinity ('nulevende'). Two species, *Procyon cancrivorus* and *Lutra brasiliensis*, now occurring near Lagoa Santa, have not yet been detected among the cave remains. As the author remarks, however, this can scarcely be taken as evidence that the animals have recently appeared in the region. Among the Carnivora whose remains are found in the caves are six extinct species, and one, *Canis azaræ*, which though now widely distributed through South America, has not yet been taken at Lagoa Santa. The extinct species are *Machærodus neogæus*, *Canis troglodytes*, *Icticyon pacivorus*, *Ursus brasiliensis*, *U. bonariensis* and *Procyon ursinus*. *Machærodus neogæus* is one of the most highly developed as well as one of the largest members of its genus. It is also one of those which have most recently become extinct. The Copenhagen museum contains numerous remains of this animal from La Plata. These, however, do not differ from the Lagoa Santa bones in any essential way. The two closely related bears, *Ursus brasiliensis* and *U. bonariensis*, are in some respects more primitive in structure than other species of *Ursus*. They form, together with *Ursus simus*, a section or subgenus which is extinct, and as yet is known from South America and California only.*

Icticyon pacivorus is closely related to the recent *I. venaticus*. It is more primitive than the latter, of which it appears to be the direct ancestor. *Canis troglodytes*, also one of the extinct species, has much the same general form as the Old World *C. alpinus*. A detailed study of its

* See Cope, American Naturalist, XIII., p. 791, 1879, and *ibid.*, XXV., p. 997-999, pl. XXI., 1891.

characters show, however, that it is in no way closely related to *C. alpinus*, but, on the contrary, is a special offshoot from some South American dog of the ordinary type. *Procyon ursinus*, while showing certain characters which prove it to stand nearer the ancestral stock than do the existing species, is considerably larger than any of the latter.

Turning now to the living Carnivora, Mr. Winge gives very extended and elaborate discussions of the specific characters and of the individual variation in both size and color of most of the forms represented in the collection. While the author's tendency to reduce the number of species to the minimum must detract from the critical value of this part of the work, the facts recorded will be of the utmost use to all workers on South American mammals. The discussions of the species of *Felis* and *Canis* are especially important.

For the most part the bones found in the caves agree perfectly with those of the living representatives of the various species. There are, however, a few exceptions to this rule. Thus, only a few of the cave remains of *Felis onca* are of the same size as those of the ordinary existing Jaguar. Most of them represent animals which were about the size of *F. tigris*. There is scarcely any difference in the teeth, but in the bones the discrepancy is very noticeable. Although the cave Jaguars average much larger than those now living, one of the latter occasionally fully equals the largest of the former. The single perfect skull of *Icticyon venaticus* from Lapa dos Tatus differs remarkably from recent skulls of the same species. The nasal bones are much more produced both before and behind, while the whole skull is larger; the rostrum is considerably broader in proportion to the brain case, and the zygomatic arches are more flaring posteriorly. If the differences between this skull and that of the recent specimen as figured on plate V. are in no way due to age and sex, few mammalogists would hesitate to separate the animals specifically. Mr. Winge, however, does not consider such a course advisable, though he admits that the Lapa dos Tatus skull may represent a 'geological race' ('men maaske er det en geologisk race').

As the result of his studies of the interrelationships of the Carnivora in general, Mr. Winge gives the following table of super-generic groups (p. 46, 47).

- Carnivora primitiva.
 - Hyænodontidæ.
 - Proviverrini.
 - Mesonychini.
 - Hyænodontini.
 - Arctocyoniidæ.
- Carnivora vera.
 - Herpestoidei.
 - Amphictidæ.
 - Palæoniictidæ.
 - Felidæ.
 - Felini.
 - Machærodontini.
 - Viverridæ.
 - Viverrini.
 - Herpestini.
 - Hyænidæ.
 - Arctoidei.
 - Ursidæ.
 - Canini.
 - Ursini.
 - Procyonidæ.
 - Mustelidæ.
 - Mustelini.
 - Melini.
 - Lutrinini.
 - Otariidæ.
 - Trichechini.
 - Otariini.
 - Phocidæ.

This arrangement differs in many details from that recently adopted by Flower and Lydekker.* The latter authors divide the order into fifteen families and one hundred and six genera, while Winge recognizes the same number of genera and only twelve families. Perhaps the most noticeable peculiarity of the present classification is the treatment of the bears, dogs and raccoons. The two former, or the families *Ursidæ* and *Canidæ* of Flower and Lydekker and of Zittel,† are here treated as subfamilies of the family *Ursidæ*, while the *Procyonidæ* are kept distinct. *Canis* and *Icticyon* are thus brought close to *Ursus*, while *Procyon* is placed in a different group.

* *Mammals Living and Extinct*, 1891.

† *Handb. der Palæontologie, Mammalia*, 1892-1893.

In matters of nomenclature, Mr. Winge, as usual, disregards the chief laws through the strict application of which stability of names is alone to be reached. He either believes that uniformity in the use of generic and specific names will best be brought about by allowing the individual preference of each writer full play, or else he takes the less optimistic ground that such uniformity is unattainable and therefore not worth striving for. Be this as it may, a casual examination of the names used in the present paper shows that the author prefers *Galictis intermedia* Lund 1843 to *G. allamandi* Bell 1841, *Lutra platensis* Waterhouse 1839 to *L. paranesis* Rengger 1830, *Thiosmus* Lichtenstein 1838 to *Conepatus* Gray 1837, *Rhizæna* Illiger 1811 to *Suricata* Desmarest 1804, *Mydaon* Gloger 1841 to *Mydaus* Cuvier 1821. He also uses the untenable names *Bassariscus*, *Ælurogale* and *Enhydria*, although they have been replaced by *Bassariscus*, *Ailurictis* and *Latax*, respectively. It is difficult to understand why *Trichechus* Linnæus 1758 based on the Florida Manatee should be preferred to *Odobenus* Brisson 1762 as the generic name for the Walrus. Yet *Trichechus* and its derivative *Trichechini* are both adopted by Mr. Winge.

Like the earlier papers of this series* the present work is divided into three main parts: (1) nominal lists of the species; (2) detailed accounts of the species with critical notes on their relationship; (3) a review of the mutual inter-relationships of the members of the group at large. To the present paper is appended a table showing semi-graphically the changes that take place in the fifth, fourth, third and second of the original seven cheek teeth throughout the genera of Carnivora (p. 100-103).

The paper is illustrated by eight plates from photographs of specimens. Although the results obtained by photographic processes are not yet sufficiently uniform to meet all requirements the figures are in general satisfactory, especially some of those on plates three, five and eight.

GERRIT S. MILLER, JR.

*Mr. Winge has already published in 'E. Museo Lundii' accounts of the rodents, bats, marsupials and monkeys of Lagoa Santa. His paper on the monkeys was noticed in SCIENCE, N. S., II., No. 50, December 13, 1895.

Ethnology, By A. H. KEANE, F. R. G. S. 1 vol. 8vo. Illustrated. Pp. 442. Cambridge University Press. 1896. Macmillan & Co., New York.

The above work is one of the 'Cambridge Geographical Series' published under the general editorship of Dr. F. H. H. Guillemard. The author takes 'ethnology' in its ancient and now generally obsolete sense, nearly synonymous with 'anthropology,' as employed in modern science. Following this definition, he divides his volume into two parts, 'fundamental ethnical problems' and 'primary ethnical groups.' Under the former he discusses such questions as man's place in the animal kingdom, tertiary and quaternary man, the growth of mind and the study of the brain in relation to thought, the antiquity of the human race, the palæolithic and neolithic ages, the theories of polygeny and monogeny, the physical and mental differences of races, their languages and social regulations.

Under the second heading the author's theory of races or groups is presented. It is a modern recast of that of Blumenbach, retaining even his inappropriate term 'Caucasian' for the white race. The other are the Ethiopian, Mongolian and American races; the Malayan race being explained away as partly Ethiopic, partly Caucasian. Of these he undertakes to give the divisions and subdivisions from such authorities as he has consulted.

The manner in which this task has been accomplished will give satisfaction to the general reader. Many questions which the student of the science must consider as still pending, Mr. Keane disposes of with a magisterial decision. He rarely presents the opposing evidence in its proper strength, and refers to those with whom he disagrees as 'eccentric,' or 'reckless,' or "extravagant," or by other disparaging adjectives. He does not hesitate to strain a point to defend his opinion (e. g., p. 34, Virchow's judgment of the Neanderthal skull), and, it would seem, cannot certainly have remembered some of the authors whom he quotes, or he would not claim as original with himself (p. xiv.) such theories as the local evolution of American cultures, the peopling of America from both Europe and Asia, the relationship of Basques

and Berbers, etc. Whether true or not, these are certainly not new views to one acquainted with the current literature of the science.

The relationship of the members of the various races is shown by 'family trees,' an ancient and necessarily misleading device. Thus, his tree of the 'homo Caucasicus' puts the Greeks, Celts and Etruscans on one of its primary branches, along with Circassians and Dravidas, while the Teutons and Slavs are on a different branch! That on this tree are placed the Samoans, Hawaiians, Battaks and Khmer is to be explained by the author's theory of the Malayan race above referred to, which he claims and which we may allow is at present, and is likely to be, his own peculiar property.

The tree of the 'homo Americanus' becomes a mass of inconsistencies so soon as he leaves the protection of Major Powell's linguistic map. Even within its area the Kolosch and Selish are depicted as proceeding from the Eskimo! The chapter on the American race is replete with positive assertions, nearly always unsupported, for instance, the imaginary distribution of two types of skull (p. 362), the alleged impassiveness of the native character (p. 353), the 'undoubted' approximation of the American to the Mongol type, etc. It is obvious that the author has not consulted the best and most recent studies in American aboriginal ethnography; yet his chapter might have been much more un instructive than it is.

The proof-reading is generally satisfactory, though probably a highly respected American writer will not think so when he sees himself referred to as 'Mr. Thomas Cyrus' (p. 370).

Of ethnology proper, in the sense in which it is now adopted by the leading German, French and American writers, the volume scarcely treats at all, and we may look in the Index in vain for the names of Bastian, Post, Steinmetz, Achelis, or the other distinguished representatives of that comparatively new and grand department of learning; and while Mr. Keane's book can be recommended as an industrious compilation, useful to public libraries and well put together, the warning should be distinctly uttered that its title is an error and that it bears scarcely at all on the science of ethnology.

D. G. BRINTON.

Las rocas eruptivas del suroeste de la cuenca de México. EZEQUIEL ORDOÑEZ. Boletín del Instituto Geológico de México. No. 2. México, 1895. Pp. 46.

The contents of the first bulletin of this series were briefly noted in SCIENCE, Vol. II., pp. 739-740. In this issue, Señor Ordoñez presents a very clear description of the important volcanic district of the valley of Mexico, and particularly of the volcanic group of Santa Catarina and of the volcanic rocks of the Sierra de las Cruces. Fourteen opening pages are devoted to giving an 'Idea general de la cuenca de México.' The remainder of the paper, largely petrographic, gives a detailed account of the cones, lava flows, breccias and ashbeds of the southwestern part of this region of andesites, trachytes and intermediate petrographic types.

J. B. WOODWORTH.

SCIENTIFIC JOURNALS.

THE ASTROPHYSICAL JOURNAL, FEBRUARY.

THE leading article is by Prof. L. E. Jewell, upon the coincidence of solar and metallic lines and upon the appearance of lines in the spectra of the electric arc and the sun. When compared with corresponding solar lines, the metallic lines of the arc spectra have been found to be almost invariably displaced toward the violet. There is, moreover, a difference in the amount of displacement of lines belonging to the same element; the greatest shift being observed in the strongest lines.

An explanation for this was sought in the difference between the condition of matter in the arc and in the solar atmosphere. This difference is probably that of pressure or density of material and temperature, or both.

The lines least displaced were those not easily reversed and visible only at a high temperature or when a large amount of material was used. As the solar lines agree most nearly with the lines produced in the center of the arc, where the temperature and density are high, we have the means of determining the pressure or the temperature of the solar atmosphere, where the Fraunhofer lines are produced, if we can separate the effects of temperature and pressure.

Several lines of investigation lead to the con-